

plants of *B. obliquum* that I have found here in Iowa not one had produced ripe spores before October; and some were as late as November.

Botrychium dissectum also ripens its spores not earlier than the last of September and often as late as November. This seems to show that *B. obliquum* and *B. dissectum* mature at least a month later than *B. t.* var. *intermedium* and *B. t.* var. *oneidense*.

These notes will give some idea as to the difference in life history of this group of Botrychiums growing in the country drained by a large part of the Mississippi River.

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Tropical American Isoetes

T. CHALKLEY PALMER

In a former number of this JOURNAL (Vol. 19, No. 1), I commented on the scarcity of material representative of *Isoetes* from South America. This condition bids fair to mend with lapse of time. At present, I am able to record additional collections from Tropical America as follows:

ISOETES MARTII A. Br. A single specimen was collected by Dr. Francis Pennell (*Pennell and Hazen*, No. 9958) in August, 1922, in Colombia, Department of Caldas. This is in the Herbarium of the Academy of Natural Sciences of Philadelphia. It is typical in every respect except as to length of leaves. These are quite short compared with the 24-52 cm. seen in previous specimens—a difference of ecological significance only.

ISOETES CUBANA Engelm. Collected by W. C. Meyers, No. 122, in British Honduras, August, 1930 (U. S. National Herbarium No. 1491113). This is of very special interest in that it is only the second gathering of the

species on record, and the first from the mainland. Habitat: "Near Honey Camp, in wet sand of water-hole on pine ridge. Part of the year covered with water." This species is notable for its very heavy bast bundles and for its handsome megaspores—perhaps the most beautiful in the genus. The specimens, considering their origin, are in unexpected conformity with Engelmann's description of the plant as it occurred in Cuba (Trans. St. Louis Acad. Sci., 4: 389. 1882). Speculation as to distributional history present themselves, but these cannot be followed here. I desire, however, to note the apparent similarity of the environment in the two occurrences, one on each side of the Yucatan Channel. Wright's (No. 3912) plants, collected in 1866, were noted as growing "in rivulets (on the bottom) of the pinewood, Western Cuba, Pinar del Rio." Those of Meyers, as aforesaid, were in wet sand on a "pine ridge."

ISOETES TRIQUETRA A. Br. A sheet holding three fine specimens of this species comes under U. S. National Herbarium No. 1495549, and Rimbach No. 103. There is no date, the only notation is: "Ecuador. Eastern Cordillera of Prisbamba. 4000 m. On swampy meadows. Only the top of the leaves within the air."

Braun's description (Verh. Bot. Verein Brand. 4. 1862) of Lechler's specimens from Peru is, of course, masterly so far as it goes, but that material was immature, and spores were entirely lacking. Motelay and Vendryès (Actes Soc. Linn. Bord. 36. 1882) have included under the same head the gathering of Spruce, Andes de Quinto. Already in 1862, Braun held the same opinion, and the manuscript name *I. Andina* need not detain us. The description by Motelay and Vendryès of the Spruce material in the herbarium of Motelay would indicate the presence of spores, but the

diagnosis is somewhat vague, and no dimensions are given. Altogether, it seems probable that these specimens of Rimbach are the first fully matured plants of this species that have come to hand. It would appear, therefore, that an emended description is in order, and this may be formulated as follows:

ISOETES TRIQUETRA A. Br. (emend.). Corm 2.5 cm. high, 2 cm. broad, bilobed. Leaves numerous, firm, stout, 10 cm. long, spreading, recurved, triquetrous, with wide membranous margins brown below, diminishing and colorless above, often approaching the abrupt, rounded, brown and shining tip. Stomata and bast bundles none. Ligule ovate-acuminate, colorless, 4 mm. long. Velum none. Sporangium oblong, rounded below, truncate above, 4 mm. long, 3 mm. broad, yellowish, with many thickened cells but scarcely brown-spotted. Megaspores 660–800 μ (average 730) diameter, white, with low papillae more or less confluent into wrinkles. Microspores reddish brown, densely echinulate, 40–48 μ long.

The firm texture of the stout leaves, reminiscent of *I. lacustris* and of *I. hieroglyphica*, is due, as noted by Braun, to the heavy walls of the long, narrow epidermal cells. The tip of the leaf is a crescentic mass of very small cells with brownish walls and glistening surfaces. Both sorts of spores are among the largest of the genus. An occasional megaspore attains a diameter of 850 μ .

The loan of specimens of the following and of the two preceding, I owe to the kindness of Dr. Maxon.

ISOETES montana, sp. nov.

Cristatae Pfeiffer.

Corm 2 cm. in diameter, apparently 3-lobed. Leaves numerous, stout, very brittle when dry, reaching 7 cm. in length, obscurely quadrangular, with pointed tip, the basal membranous wings brown-edged, attenuate to thrice the height of the sporangium. Stomata present, bast bundles none. Ligule fleshy, irregular, brown or black. Velum thick, opaque, yellow-tinted, approxi-

mately complete. Sporangium oblong, 5-6 mm. long, brown, the trabeculae often dark brown and shining. Megaspores white when dry, plumbeous when wet, 500-700 μ (average 611) diameter, all faces densely set with high, very thin, crested columns and ridges. Microspores brown, red-brown when wet, nearly smooth, 31-39 μ long.

✓TYPE: *H. E. Stork*, No. 2361. Costa Rica, Poas Lake, June 5th, 1928. "A submersed plant, in sandy shallows about a foot deep on the average. Elevation 8500." U. S. National Herbarium No. 1490673.¹

Later, at Dr. Maxon's request, Professor Stork forwarded another sheet (U. S. Herbarium No. 1409949) supporting a second specimen of the same gathering, together with photograph and a letter descriptive of the habitat; from all of which it appears that this lake is in the crater of an extinct volcano. "Sphagnum growing in mats on the bank indicates the acid nature of the water."

The nearest relative of this species is undoubtedly *I. Salvatieri* of the remote, desolate region about the Straits of Magellan. From this it differs in the nearly or quite complete velum, and apparently in the size and shape of the sporangium. In Professor Stork's plant the velum is very thick and opaque, and quite different in appearance from a velum as usually seen. It shows at most a minute, round, dark-rimmed opening at the

¹ ISOETES montana, sp. nov., cormo diametro 2 cm. ut videtur trilobato; foliis multis crassis siccatis fragillimis ad 7 cm. longis obscure quadrangularibus apice brunneis acutis, stomatibus instructis, fasciculis fibrosis carentibus, alis basalibus membranaceis brunneo-marginatis superne attenuatis sporangium triplo superantibus; ligula irregulari succulenta brunnea vel atra; velo crasso opaco flavo-tincto fere perfecto; sporangio oblongo 5-6 mm. longo brunneo, trabeculis saepe atro-brunneis lucidisque; megasporis siccatis albis humentibus plumbeis diametro 500-700 μ (circiter 611), faciebus omnibus columellis rugulisque altis tenuissimis cristatis dense onustis; microsporibus brunneis humentibus rubro-brunneis fere laevibus 31-39 μ longis.

base. There is a considerable amount of brown pigment about the base of the leaf; and within the sporangium is a layer of brown amorphous matter, gelatinous when wet, which shows through the wall. The sculpture of the megaspore recalls that of *I. saccharata*, but the columns and ridges are much more numerous, and more slender and delicate.

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New Tropical American Ferns—VIII¹

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The two new species here described are based on specimens collected rather recently in Panama. Both are exceedingly well marked.

15 *Adiantum cordatum* Maxon, sp. nov.

§ *Hewardia*. Habitu et nervis areolis plus minus elongatis omnino anastomosantibus *Adianto diphylo* proximum, quod pinnis manifeste petiolulatis late cuneatis nec incumbentibus cordatisque, sporangiorum annulo incrassato 18–20-articulato, sporis atris valde trigonis opacis satis recedit.

§ *Hewardia*. Rhizome short-creeping, 5–10 cm. long, about 5 mm. thick, roughly nodose from old pseudopodia, finely paleaceous; scales bright brown, about 2 mm. long, linear to lance-subulate, laxly ciliate at base, remotely so toward the filiform tip. Fronds 6 or 7, closely tristichous, rigidly ascending, 25–55 cm. long, the stipes mostly very much longer than the blades, 1–2 mm. thick, subterete, narrowly sulcate ventrally, atropurpureous, lustrous, finely paleaceous at extreme base, glabrescent; mature blades simple or simply pinnate, if simple elongate-cordate, 10–18 cm. long, 6–10 cm. broad, very

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